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AMERICAN NURSERYMAN

The Nurseryman's Forte: To Make America More Beautiful and Fruitful

MAY 1, 1936

Spiraea Trichocarpa

Pruning Ornamental Trees and Shrubs
Laying Out a Flower Garden
Annuals for the Rock Garden
Hardy Stocks for Apple Trees

AMERICAN NURSERYMAN

Chief Exponent of the Nursery Trade

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STOCKS FOR FRUIT TREES.

The problem set before the trade in Dr. H. B. Tukey's article entitled "Made-to-order Fruit Trees" in the February 15 issue of The American Nurseryman engendered a good deal of discussion. The views of two practical nurserymen of long experience were published in the issue of March 15. Equal interest has been shown by workers in the scientific field. T. J. Maney, head of the pomology subsection at the Iowa agricultural experiment station, submits the findings of himself and H. H. Plagge in observations and tests of hardy stocks for apple trees in his state, and these are printed in this issue under the heading, "Hardy Stocks for Apple Trees." From the correspondence evoked thus far it is quite obvious that nurserymen, orchardists and scientists are all thinking in terms of more concentrated and accurate methods, and less haphazard production, to save the waste which the latter involves in time, money and land. A consequence may be closer control of propagation, better prices to nurserymen and better products and income for orchardists.

FUNGUS FAVORED BY SNOW.

Sometimes heavy snow, strange though it may appear, is favorable to the development of fungus disease. The black velvet fungus of the white pine, to use a common name in place of the more technical Herpotrichia nigra, is one of the organisms which occasionally develop in great abundance on white pine branches well protected or partly covered by snow. Badly affected portions look much as though they were thickly covered with soot. Sometimes it is so abundant as practically to triple the diameter of most of the needles and form thick, scaly clusters upon the twigs. This fungus is limited almost entirely to small trees, especially the lower branches. Those which are badly affected may be killed. The disease is more serious in the higher altitudes where deep snows are prevalent. The unusually deep snows of last year appear to have been a factor in producing conditions favorable for the local prevalence of the fungus. In Europe it is known to attack spruce, mountain pine and juniper, and in sections where heavy drifts of snow are likely to occur, it often kills entire trees. No such general occurrence and damage have come to attention here.

The growth of the fungus cannot be attributed to the snow itself, but rather to the conditions produced by the snow, namely, abundant moisture and restricted circulation of air. Many fungi, such as the leaf spots, develop with astonishing rapidity during wet, humid periods. This black velvet fungus of pine thrives under similar conditions, even though the temperature is decidedly low. It is a striking case of a reaction to extremely limited atmospheric conditions. The same thing, though usually on a much larger scale, may be seen in the development of leaf blights in low, moist areas, especially those surrounded by walls or vegetation and, thus, with a definitely limited circulation of air and high humidity.

ELM DISEASE IN BRITAIN.

Some diversity of opinion exists in this country as to the importance of the elm disease which occupies much attention in several eastern states. One does not wish to be an alarmist, nor, on the other hand, can one view the prospects without apprehension when reports from abroad read like the following excerpt from a British trade periodical:

According to the forestry commission's annual survey, elm tree disease in Great Britain is persistently spreading. For three years the disease has been static, but it is now again approaching the peak year of 1931. The disease is now common in southeast Dorset and northeast Hereford and it appears to have a strong hold in parts of Worcestershire. Here no fewer than 500 trees on one estate have had to be cut down.

One of its worst instances is the King Edward VII avenue at Windsor, which was planted with elm trees by the late king. Experts are advising the cutting down of the entire avenue. Professor Dallimore, of Kew, who has examined the trees, says they are so badly diseased that they should be removed immediately. Windsor town council is replacing sixteen of the trees with horse-chestnut trees.

The forestry commission is unable to suggest a cure for the disease or a method of controlling the beetle which paves the way for infection by the deadly fungus. Consequently, the planting of elm trees is a proceeding fraught with risks that should be weighed by landowners and others. No species or variety of elm seems to be immune, though some are, apparently, more resistant than others. In Holland, where the disease is thought to have originated, the Huntingdon elm, Ulmus vegeta, is found to be more resistant than most European elms, but observation here shows that it is not immune. Some of the Asiatic elms are on trial, and it is possible they may bring immunity.

SPIRÆA TRICHOCARPA.

A good shrub to suggest to the buyer who likes the common bridal wreath, but wants something a little different from this much-overplanted subject is Spiræa trichocarpa, illustrated on the front cover of this issue. It is a handsome spreading shrub, rarely exceeding five feet in height; hence, being somewhat lower-growing than Vanhouttei. In addition, the former blooms about two weeks later and has larger flowers than the common bridal wreath. Otherwise they are fairly similar.

Spiræa trichocarpa is native to Korea, which accounts for its common name, Korean spiræa. In the time of the plant world, this is a new introduction, being first brought to this country in 1920. However, it is only in the past few years that it has become generally available. Because of its later flowering period, it can be used also in plantings in combination with Vanhouttei to extend the blooming season, which some years is all too short.

The propagation and general culture of the Korean spiræa are simple and similar to those of the common bridal wreath, so that this new shrub should become a valuable acquisition to both the general nurseryman and landscaper.

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Pruning Ornamental Trees and Shrubs

The Effect of Pruning on the Functions and Growth of the Plant First of a New Series of Articles by L. C. Chadwick

Pruning as a horticultural practice has been performed for a great many years. There is nothing mysterious and little new in its operation, yet it is not uncommon to find plantsmen pruning ornamental trees and shrubs with little thought in mind of what the ultimate effect of the operation may be upon the growth of the plant. Foremost in the mind of the pruner should be the anatomical and physiological functions of the plant and how these may be suppressed or stimulated to bring about the desired results. Pruning has been defined as the suppression of certain plant parts that are no longer effective nor required, so that additional energy may be available for the development of those parts which best satisfy the requirements of the particular situation. It is then that pruning should be more often considered on the basis of its effect on growth or on the shape of the plant rather than of the necessity of the removal of dead and broken branches or the making of clean cuts.

Most horticulturists now realize that plants are living organisms and not just masses of material. Plants, being composed of living cells and tissue systems, are capable of modifying their normal habit of growth or mode of development under the influence of external stimuli. The modification of the plant body may take place even in the seedling stage, since at that time the primary body is structurally and functionally complete. The tissues of this body are capable of performing the necessary physiological functions by cell differentiation, bringing about cells of various sizes and shapes fitted for definite processes. Secondary growth is brought about by the new cells formed from the cambium layer, the most active of the meristematic tissues. These cells cut off by the cambium layer during growth compose the main vascular tissues of the stem. Those within the cambium aid in the movement of water and mineral elements from the roots to the leaves, where plant foods are manufactured. The tissue bordering the cambium on the outside functions in the movement of the foods downward in the plant and, with others, in the storage of foods.

It is not necessary to discuss the other parts of the plant body to show that each part has a definite function to perform and, when these proceed uninterrupted, normal growth takes place. Just as true is the fact that if certain plant parts are interrupted in their normal function, variations in its customary development occur. Thus it is possible for the plantsman to suppress or stimulate some of the plant parts to bring about the type of growth and development he desires.

Effect of Dormant Pruning.

If one turns to the literature, he is faced with the fact that there is little scientific information available to form the basis for pruning practices with ornamental plants. Few pieces of research have dealt entirely with ornamentals. Thus it is necessary at present for the plantsmen to base their operations mainly on the results of tests conducted with fruits. While the ultimate aim in the production of a fruit tree generally differs from that of ornamental plants, many of the fundamental operations can be applied equally well to both types.

In discussing the response of plants to pruning at different seasons, I should like to mention, first, a few facts concerning the effect of dormant pruning on growth of young plants. The most evident effect of pruning of young trees at this season is an increase in vigor, especially during the following spring months. Vigorous shoots are produced near the cut end, and these continue to grow later in the season than normal shoots and usually bear somewhat larger leaves of a deeper green color.

The causes of this increase in vigor may be due to a number of things, often not clearly understood. One of the principal reasons seems to be the increase in the amount of water supplied to the growing points. This may be accounted for by the fact that, at least at the start of the growing period, the roots continue to absorb water as does the tree not pruned and this water is readily conducted to the top of the tree, the leaf surface of which has been reduced by the pruning operation. Closely correlated with this is the fact that on the pruned trees there is a smaller number of growing points remaining to use the stored food and the water supplied. There is some evidence to show that the efficiency of conduction of water and mineral nutrients in pruned trees may be increased over that of the unpruned trees. This may be accounted for by the less hindrance to ready conduction in the straight, vigorous shoots and, due to the cutting back of the branches, the growing points are nearer the roots.

On some plants the invigorating effect of pruning may be due to the removal of flower buds, which, if allowed to develop, greatly reduce the food supply to the growing points. This might be especially true with such plants as the magnolias and flowering crabs and cherries. One of the benefits of pruning newly planted trees that flower profusely in early spring is the conservation of energy which would otherwise be expended in developing flowers and fruit.

Regardless of this early invigorating effect of pruning, especially on shrubs and small trees, it is, nevertheless, a dwarfing process in the long run. This dwarfing is caused by the amount of wood removed, combined with the reduced leaf surface, which eventually leads to a reduction in root growth, due to lack of sufficient food. This statement may be made clearer by citing two examples of tests with small fruit trees. In one test it was shown that the tops of nonpruned trees at the end of a 5-year period were thirty-three per cent greater and, at the end of a 10-year period, seven per cent greater than those of trees receiving pruning termed normal. In another test it was shown that, although the leaf surface increased more rapidly in slightly and severely pruned trees than in nonpruned trees, the latter had much the larger total leaf surface at the end of the season. Also, the effect of top pruning on the growth of roots was clearly shown by the fact that, at the end of the first year, the weight of roots on nonpruned trees was nearly twenty-five per cent greater than that of trees pruned slightly and sixty-five per cent greater than that of those pruned severely. The figures presented in these tests indicated that the reduction in root growth following pruning was considerably greater than the reduction in the top of the tree. This probably can be accounted for by the fact that the pruned trees produced less food and a larger percentage was used in the growth of the tops than in the unpruned plants. Thus much less food was available for root growth.

The effect of dormant pruning on mature plants may be even more pronounced in causing invigoration. With some types of fruits a rather severe pruning may probably prolong the life of the plant and, when done at an opportune time, may prevent, to a certain degree, the tendency for alternate flowering and fruiting.

Since much of the pruning of ornamental plants is done during the dormant season, it is important to have information regarding its effect when performed at different times during this season. In choosing the best time to prune, such factors as food supply, the rapidity of wound healing and, with some plants, bleeding should be considered. We know all too little about the changes in nature and movement of foods in the plant during the dormant season. There is little evidence to show that there is a noticeable movement of food downward during the winter months. If this were true, we should prefer to delay the dormant pruning until the time when the removal of branches would lower the food supply of the plant the least. Until we have more evidence it may be best to follow the customary practice of delaying dormant pruning until after the first of the year.

This period is also satisfactory from the standpoint of ready healing of the wounds. Any time between February 15 and May 15, varying in different sections, seems equally effective.

Effect of Summer Pruning.

The effect of pruning in summer will depend upon the time it is performed and upon various climatic and soil conditions. If done early in the summer, the influence on growth will be much the same as follows dormant pruning. If the growing season is relatively long, it will allow for proper maturity of the wood before cold weather. An abundance of moisture would undoubtedly delay maturity. Pruning in summer may lead to a greater reduction of top and root growth than an equally severe pruning during the dormant period.

Pruning during late summer, if delayed until after the rest period begins, will also have much the same effect upon the plant as dormant pruning except as it influences maturity and hardiness. If the operation is done at that season it usually materially delays maturity and hardiness. An ample and healthy leaf surface is imperative to proper maturity and hardiness. Especially is this important with those plants that are tender. Digging plants before they become thoroughly ripened may cause considerable loss in storage. This is often the case with roses. After the budding of apples it is wise to leave the top of the stock on the plant until the following spring so as to allow the maximum production of food, which fosters good root development and maturity of the aboveground parts.

If pruning is done during midsummer before the rest period starts, it usually results in a greater dwarfing than when performed at any other period. When the operation is performed at that time the early invigorating effect may even be at a minimum. This severe dwarfing may be accounted for by the fact that pruning at this time decreases the food supply by reducing the leaf surface to the same extent as dormant pruning and, in addition, if done soon after the flowering period, considerable energy will have been used up in this plant function. It is seldom that normal pruning would be recommended for midsummer.

In conclusion, it is well to point out a few details of how pruning practices affect top growth. In general, the cuting back of branches will increase the thickness of the top, the amount of shoot growth, as mentioned before, and likewise the size and color intensity of the shoot leaves. On the other hand, thinning out may tend to increase the length of individual branches. The greatest dwarfing of an individual branch will follow when it is pruned and the rest of the top left unpruned. Both of these operations tend to reduce the total amount of growth in the long run. Thus they should be practiced only when specific needs demand.

A forthcoming article will discuss actual methods of pruning ornamental plants as practiced by landscape gardeners and nurserymen.

ELM LEAF BEETLE.

The elm leaf beetle is one of the most destructive insects attacking elms. It is about one-fourth inch long and yellowish green in color with a distinctly darker stripe along each side of the wing cases. The beetles pass the winter hidden under rough bark. In the spring they lay their eggs on the undersurface of elm leaves. The larvæ, hatching from these eggs, feed on the undersurface of the leaf and practically skeletonize it. Spraying in early June, or as the larvæ appear, with arsenate of lead, three pounds to fifty gallons of water, will control the beetle. This spray should be directed especially to the underside of the leaves. As there are two generations a year, a second spray is necessary by the middle of July.

Laying Out a Flower Garden

Development of Small Areas as Attractive and Usable Part of the Home Grounds — By Donald J. Bushey

In laying out a flower garden, a study should first be made of what there is to work with, the floor plan of the house, the area available for the garden, existing plant material within or near this area, the slope of the ground and the condition of the soil. For the present the two major factors in locating the garden may be considered, first, that it must be placed so it will receive the sunlight during at least half the day and, second, that it shall be so associated with the house or a frequented part of the grounds that it may afford the greatest pleasure and convenience.

In many situations, especially with houses recently built, the foundation is low. The first-floor level is only twelve to fifteen inches above the grade of the lawn. If such is the case and the house was not originally planned for a connection directly from the house to the garden, it is often reasonable to suggest the conversion of a window into a doorway leading from the living room or the dining room to a low porch or a stone or brick terrace. This new construction will give immediate access from the house to the garden. Such a change would not be unduly expensive and would be a decided asset. It would make the home grounds more usable and livable and would form an attractive foreground for the garden or lawn area.

Small Areas in Straight Lines.

The outline and nature of the space to be devoted to the flower garden are factors that, to a great extent, will limit its design. This is especially true if the area is small. In spite of limited space, it is possible to develop an interesting plan on a long, narrow, level area, such as is available in the rear part of many city properties where the lot is narrow, the house is placed on one side of the property and the driveway is on the other side, leading straight back to the garage. The space left for the garden may be fifteen to twenty-five feet wide and twenty-five to fifty feet long. To make the most of this area, the best plan of simple design would be to have a straight central grass panel or path, five to ten feet wide, flanked on each side with a border of flowers. Whether the garden is formal or informal in plan, it should be inclosed with a shrubbery border, trimmed hedge, vine-covered trellis or wall, which will give privacy and conceal this feature from other parts of the grounds or from outside property. This inclosure will be placed behind the flowers and will serve as a background for the color produced by the plants. If there is ample room for this background planting, a staggered row of shrubs is effective. In selecting the kind of plant or plants to be used in this border, it should be kept in mind that those whose mature height is six feet or more will give privacy, while those varieties that will grow only three to four feet in height, or below the eye level, will not give the privacy desired. If space is limited, a single row of hedge plants may be substituted for the informal border. The informal border would require six to seven feet of space, while the trimmed hedge would need only two feet. In a still more limited space, as narrow as six inches, a fence or trellis covered with flowering vines will serve the purpose. If privacy is desired, the trellis must be six feet or more in height, or above the eye level. Now, to put a finishing touch on this garden, an architectural feature, such as a pergola or garden seat, may be located at the end of the grass panel farthest from the house and on the center line of the path. From the standpoint of appearance, this will be a terminal feature for the picture as seen from the house or terrace and from the standpoint of usefulness it will be a resting place from which one can view the garden. This little flower garden will be a complete unit in itself.

Formal or Informal?

The appearance of this garden will vary considerably with the selection and arrangement of the plant material. It will have a formal appearance if the plant material is symmetrically placed. To accomplish this effect, formal dwarf evergreens may be placed at each of the four corners of the grass panel. Usually a globe-shaped plant, such as Mugho pine, globe arbor-vitæ, box or Japanese yew, will serve the purpose. The flowers are placed on each side of the grass panel, with a low-growing border plant used as an edging and the taller flowers used between this edging and the background of foliage or masonry. With this type of planting, a trimmed hedge or wall is the most appropriate background. The whole effect is one of symmetry.

Factors Favoring Informal.

For most places a planting that is more informal will be best. A larger variety of plant material is usually chosen for this purpose. Clumps of each variety to be planted are irregularly placed in the flower borders, with care to use the taller-growing kinds in the rear and the lower ones in front. The preferred color combinations can be worked out. This is usually not done to the client's liking the first year, because the garden lover will be changing the border continually. That golden yellow columbine in the far corner comes in bloom at the same time as the orange Iceland poppy near the terrace. They would form a good color combination; so the client marks them as a part of the next fall's transplanting work and next spring they will be blooming side by side. And so changes take place from year to year, as each season the garden is more to the owner's liking than before. The background for this informal garden should be a border of shrubs grown in their natural size and shape or a trellis, fence or wall covered with vines.

Now, consider the same property, but imagine the ground to be sloping gently upward away from the house. The same general plan may be used, but it may be varied slightly with small additional expense. Starting with the original grade at the edge of the terrace and working toward the back, take off enough soil to make the path level or nearly so. This may be continued to a point three to five feet in front of the position for the pergola. The soil thus obtained may be used across the far end, so

that a terrace of soil is made from six to twelve inches above the level of the path. This terrace should be adequate in size to form a suitable setting for the pergola. Stone steps may be placed between the lower and the higher levels. A slight change in elevation such as this will add considerably to the interest of the garden. In this situation, also, the effect may be formal or informal depending upon the planting design. The general plan described is, of course, not the only one that would be appropriate for such an area. Little modifications of it here and there may be more to the liking of the client. The general idea may serve as a basis from which to work and from which a suitable plan may be evolved. In most cases, small areas are better developed along straight lines, which permit the best use of the available space.

Preparation for Planting.

After preparing the plan, it is a good idea to outline the garden completely before any work is done, using as many stakes and as much string as are necessary to visualize the effect of the plan. Put the stakes close enough together to follow exactly the lines of the grass areas, flower beds, shrubbery borders and any furniture to be used. It is much easier to make any necessary changes at this stage than it will be later.

The soil may now be prepared in places where it is necessary. Heavy clay soils may be improved by adding sand, humus, leaf mold or fine cinders and mixing it into the soil thoroughly for a depth of ten to twelve inches. Sandy soils may require clay, peat moss, humus or leaf mold added in the same way. Soil that is not fertile, especially that in the flower beds, should have a complete fertilizer mixed into it. This may be added at the same time with the other ingredients. There are many trade-name complete fertilizers available, and any of these that contains approximately four per cent nitrogen, twelve per cent phosphorus and four per cent potash may be used to advantage when applied at the rate of four or five pounds per 100 square feet. Manure and compost may be used, but these materials will usually carry weed seeds that may be troublesome later. Neither of these will add much fertility to the soil. This process of soil improvement will also provide ample drainage for most places if the level of the ground is such that surface drainage is obtained. If difficulty is encountered in this respect, a 3-inch clay tile drain must be placed under the flower beds eighteen to twenty-four inches deep.

Large trees near this area may be detrimental to the good growth of the flowers. The shade produced by them is a factor, but is not so important as the competition with the roots. A shallow-rooted tree will absorb the nutrients and water from the soil and so necessitate special frequent feeding and watering for the better growth of the flowers. A young tree of a large-growing variety may be moved to a more remote position. Other plants, such as shrubs and flowers, that do not conform to the plan may be removed or transplanted to a place where they will fit into the scheme.

The new plants may now be set according to the specifications of the plan. If the client wishes to have an immediate effect and is willing to pay an additional amount to obtain it, large plant materials must be used. This is especially true for the plants to be used as a background for the seat or pergola and the plants used in the inclosing planting. Such a development would be ideal. Many people cannot afford to do this, but still want an attractive garden. They are willing to sacrifice an immediate effect in order to save on the original expense involved. In this case small plants must be used, and they should be spaced with regard to their mature height and spread. The ultimate effect will be the same as the garden in which large plants are used, and still the financial requirements of the client will have been met.

BUDDLEIAS FOR LATE BLOOM.

Counted upon for late bloom, the familiar butterfly bushes, being for the most part tender-wooded, do best if all growth is cut back to the ground line each spring. This produces bushier, more symmetrical plants. Perfect drainage, a rich soil and a sunny location are further requisites to their successful culture.

The beautiful orange-eye butterfly bush, Buddleia Davidii, has proved one of the most satisfactory species. Of vigorous growth, the sturdy, gracefully arching branches often reach a height of six feet or more in a single season. The long, nodding flower panicles, which are produced continuously from July through September, are composed of many small lilac-colored flowers with conspicuous orange yellow throats. Several fine varieties of B. Davidii are available, among which is the earlier-blooming, mauve-colored B. Davidii Veitchii. Equally good is Buddleia microphylla, a robust bush, with densely flowered panicles of tiny, deeper lilac blooms. Buddleia albiflora, a white-flowered relative of B. Davidii, does well.

COLLECT SEEDS BY TONS.

Thirty-five thousand pounds of tree seed capable of producing one hundred million seedlings has already been collected by twenty-three crews of pickers in nine sections of the northwest. The seed collected is being trucked to the Moscow conservation service warehouse, where it is threshed. Since the uncleaned seed sent in is threshing out a higher per cent of cleaned seed than was expected, no doubt a large part of the northwest collection will be available for use in the middle west. "Further encouragement is seen in the fact that seed produced in the northwest is of high quality," according to Mr. Svendby, forester of the soil conservation service, who is working with Dr. A. L. Hafenrichter, acting regional nurseryman.

The gigantic seed collection program covering nine regional areas in the United States is serving a dual purpose in giving employment to several thousand unemployed on work that is necessary and of lasting benefit. Such a program of revegetation and reforestation as is being inaugurated on submarginal or severely eroded lands by the soil conservation service and the soil conservation nurseries is necessary to check water and soil losses.

Although black locust constitutes over ninety per cent of the seed collected, Russian olive, caragana, green ash, black walnut, chokecherry and oak will play a part in the program.

The soil conservation nurseries are dedicated to the threefold program of (1) collecting bulk lots of tree seed not available commercially, (2) collecting seed of native grasses in quantity and (3) testing native grasses, legumes, browse plants, shrubs and trees that may be of value in the conservation program.

Annuals for the Rock Garden

Plants That Fit into Alpine Scene and Add Color When Perennial Bloom Is Lacking—By C. W. Wood

Notwithstanding all that the purists may say to the contrary, there is a definite place for annual plants in the rock garden. There are always periods during summer and autumn when there is little color in rockeries if full dependence is placed on plants of perennial duration. It is true, of course, that careful planning and manipulation will give some flowers during every week of the open season, even with perennials alone, but spreads of colorful bloom are not always to be had unless annuals are a part of the operation. Fortunately, too, not all gardeners are so wedded to perennials that they will not use an annual in their alpine plantings, provided it fits into the alpine scene.

That last phrase—provided it fits into the alpine scene—is of the greatest importance. One reason annuals are taboo in so many rockeries is because of poorly adapted kinds that have been recommended by plant growers and used by some beginners in the craft. The so-called florists' flowers, such as petunias, calendulas, nasturtiums, etc., because of their very nature, have no place in such plantings. There are plenty of annuals, however, that are adapted to rock garden work, many of them easily grown and of long blooming habit, and these present a wonderful opportunity to increase sales. Some of the items mentioned later may be had in bloom in 2½-inch and 3-inch pots in eight weeks from the sowing of the seeds. Others take longer, but it is possible to market practically all of them in 2¼, 2½ and 3-inch sizes.

The following does not by any means exhaust the list of good rock garden annuals. It is hoped, however, that it will make a good starting point for a profitable venture in this branch of plant sales.

Pimpernels belong to the primrose family, the ones of interest in our present inquiry being tender perennials that are treated as annuals in the north. There is so much confusion in their naming that it is never safe to buy them by name alone. Two kinds are of importance because of their long blooming habits and good colors. One has large, bright blue flowers and is usually listed as Anagallis Phillipsii, though it may bear any one of a half-dozen others; the other is a vivid scarlet and may be looked for under the name of A. Monellii or otherwise. Look for these descriptions rather than for any particular name. Both kinds are probably varieties of Anagallis linifolia, a native of the Mediterranean regions. Both are low-growing plants, seldom over five or six inches high, and are good to clothe the sunny wall. They are easy to grow from seeds, standing several degrees of frost, and particularly good specimens may be propagated from cuttings of soft shoots.

Most gardeners say that the blue woodruff does best if seeds are planted directly in the open where the plants are wanted, but I have found that satisfactory results follow pot culture. Seeds started into growth by mid-March or April 1 should give plants that will commence flowering in June. The plant grows about ten inches high and produces pale blue flowers over a long period. It, too, is confused as to naming, being generally listed as Asperula azurea or A. setosa, though a combination of these two names is often used. Botanists tell us that it should be A. orientalis.

Baeria, a group of California composites, is of less appeal, being little more than just another yellow daisy. I have found some demand for it, however, especially among beginners, who like their flowers on the showy order. B. gracilis, growing six to eight inches high, is the best that I have found. Its period of bloom is rather abbreviated, making it necessary to start two or more plantings during the season if continuous flowering is desired. A better way, according to experience here, is to delay the first sowing until sometime in May, marketing the plants in late June or July for flowering after the heavy blooming period of other plants in June is over.

About the only difficulty one is likely to experience in growing Arnebia Griffithii is to find the seeds. After these are secured, the plants grow readily, doing well in any common soil in sun, producing long-tubed, yellow flowers during the summer. It is somewhat tender to frost, so should be started in heat and outdoor planting delayed until June. Plants in 3-inch pots in that month are good sales material.

No annual of my acquaintance is better suited, from every standpoint, to rock garden conditions than is Gilia micrantha. This is the Leptosiphon hybridus of most seed lists, growing three or four inches high and producing a profusion of flowers in a wide range of colors and over a long season. Seeds planted in April should be in bloom in 2¼ or 2½-inch pots in June.

Although really a perennial, Ionopsidium acaule, because of its tender nature, has to be treated as an annual in the north. This is a plant of many uses, being of value in the window garden, where it proves to be practically everblooming, but its greatest use is in the cool, moist sections of the rock garden. There it forms a pleasing carpet of green, over which shine little, 4-petaled, lavender flowers during most of the summer. It is as easily grown from seeds as any crucifer and a sure seller.

Composites are apt to be too coarse for the rock garden scene, but that is not the case in Felicia Bergeriana, a bewitching, little, blue-flowered daisy from South Africa. It is for all the world like a tiny aster; in fact, the felicias were included in the genus aster by some earlier botanists, later being known as agathæa. It makes tiny tufts of foliage, from which spring a number of 6-inch stems, each bearing a single flower about a half-inch in diameter and of an intense blue with a lemon center. It does well in pots, blooming there as readily as outdoors.

Limnanthes Douglasii, a native of California, is not half appreciated by gardeners, a fact that you can help to correct by offering your customers pot-grown plants in May and June. It is a rather vigorous grower, is of somewhat trailing habit and gives

best results in dry, sterile soil in sun. There it will produce its fragrant, yellow cup-shaped flowers over practically the entire summer.

Normally the height of eighteen inches, which Heliophila linearifolia attains, would bar it from the rock garden, but actually its graceful growth seems never out of place there. It has two drawbacks, according to my experience, one being its desire for more than the average amount of moisture and the other a rather abbreviated period of usefulness. Yet the beauty of its blue flowers is worth the trouble to circumvent these shortcomings.

Many forms of Nemophila Menziesii are of value for the purpose under consideration, though probably none equals that of the one known to gardeners as N. insignis, popularly as baby blue-eyes. It is half-trailing, producing a profusion of sky-blue flowers with white centers and growing best in half shade. Its period of usefulness here in northern Michigan seldom extends over a month; so it is well to have a succession of sowings coming on to fill the demand throughout the summer.

Most of the good points of a desirable rock garden annual are possessed by Phacelia campanularia. It is easily grown in any well drained soil in sun, producing its rich blue flowers throughout the summer. It is not easily handled after it attains much size, but pot-grown plants give no trouble. It grows from eight to ten inches high.

All rock gardeners think they have to have a saxifrage, but few beginners have the facilities or the knowledge to grow many of the perennial species. If a garden contains a moist spot, there is no reason, however, why the annual Saxifraga Huetiana cannot be enjoyed, provided, of course, that the gardener can find seeds or plants. The latter is not always easy, for most dealers in rock garden plants utterly ignore annuals. The plant is a neat trailer with 5 to 7-lobed cordate leaves and yellow flowers on 3 to 4-inch stems. In the absence of moisture, shade will usually make the plant feel at home, when it will self-sow quite freely. When seeds are found, they are more than likely to be listed as S. Cymbalaria.

One of the best selling rock garden annuals that I have found is that little blue-flowered sedum, S. cæruleum. Amateurs so often have been told that the seeds should be sown where the plants are to flower and have been unsuccessful in the practice that they jump at the chance to buy plants in flower in 2¼-inch pots. It seldom grows over two inches high in a dry, sunny soil, spreading out into small mats, over which shine the tiny blue flowers during much of the summer.

W. J. MALONEY.

William J. Maloney, president of the New York State Nurserymen's Association, has had an active trade career. His position as secretary-treasurer of Maloney Bros. Nursery Co., Dansville, N. Y., has been held since the inception of the firm, one of the oldest nurseries in the state. In the group of which he was named the head last year, he had previously served for several years on the executive committee. Forwarding also the activities sponsored by the American Association of Nurserymen, Mr. Maloney has been prominently identified for a long period with the committee on standardization and sizes and is, in addition, now serving on the legislative committee.

Mr. Maloney's exceptional experience with fruit stocks and orchard requirements has led to his appointment by the New York State Horticultural Society to a committee named to make a study of understocks for growing better fruit trees. The specific objective of this committee is to ascertain if it is possible for certain varieties of apples to develop into stronger trees when budded on certain types of seedlings. Associated with Mr. Maloney in this work are Dr. Harold B. Tukey, of the New York state experimental station, Geneva, and George K. Morris, Williamson, N. Y.

William J. Maloney.

A diversification of interests is indicated in the fact that Mr. Maloney is a past president of the Rotary Club of Dansville, the Dansville General hospital and the Dansville Board of Trade.

The Maloney Bros. Nursery Co., operating 400 acres, is one of the largest mail-order nursery houses in New York. It is not only one of the leading growers of fruit trees in its home state, but one of the ten largest growers of such stock in the country. Besides carrying on a retail, catalogue, agency and wholesale business, the firm operates numerous retail stores for the sale of shrubs and other nursery stock and provides a landscape service.

NEMATODE IN ARKANSAS.

The root-knot nematode has become a serious problem to the nurseryman who grows ornamentals on a sandy soil. Because of infection by this organism, the state plant board this year laid restrictions against the sale of one or more blocks of ornamental stock in twelve of Arkansas' eighty-eight nurseries.

Ornamentals found infected were abelia, althæa, barberry, butterfly bush, cape jasmine, forsythia, hydrangea, lilac, privet and spiræa. While not all of these appear to be seriously injured by the root-knot nematode, its presence on the roots makes the plant a carrier, and sale of infected plants is prohibited.

Although the root-knot nematode attacks and severely injures several kinds of fruit trees, notably the peach, fruit tree nurserymen have learned to avoid trouble to a large extent by shunning land which is likely to be infected.

WHY THERE WERE FLOODS.

In New York, Virginia, West Virginia, Maryland and Pennsylvania, March rainfall averaged around three inches, the equivalent of thirty-five billion tons of water upon soil already saturated from previous rains and melted snow.

Hardy Stocks for Apple Trees

Experiences and Experiments in Middle West in Production of Better Fruit Trees — By T. J. Maney and H. H. Plagge, of Iowa Agricultural Experiment Station

The apple trees in our midwestern orchards are propagated mainly by root grafting on seedling stocks, the seed of which is produced by the cider apples of northern France and central Europe. This stock is commonly designated as French crab, the seedlings of which are grown in this country from imported seed. The Kaw river valley of Kansas is the most important center engaged in the growing of these French seedlings. The growing of apple seedlings is also becoming an important nursery industry in the state of Washington. These seedlings are grown mainly from seed of local commercial varieties.

With this type of stock as a foundation for our orchard industry we find that our trees reach maximum bearing capacity at fifteen to twenty-five years, then begin to deteriorate and gradually pass out of the picture in thirty to thirty-five years. Of further interest is the fact that in our orchards approximately thirty per cent of the trees bear sixty per cent of the crop. The remaining seventy per cent are what might be termed loafers, and they produce about forty per cent of the crop total.

About sixteen years ago horticultural investigators began a critical study of the production behavior of the individual trees in orchard plantings and found, over a period of years, variations in tree production sufficient to discount the value of any cultural treatment applied for the purpose of bringing out differences between diversified treatments. In view of this situation, certain other limiting factors being known, it was only logical to assume that this variation was perhaps due to the unknown influence of the understocks. Each stock, being of seedling origin, was a distinct individual which possibly differed from every other stock in respect to its form of growth, vigor, hardiness and disease and insect-resistance.

Use of Dwarf Stocks.

For years dwarf stocks had been used in Europe and eastern America to develop standard varieties into slow-growing diminutive trees which could be adapted to a wide range of training practices. These dwarf stocks, the best known of which is the French Paradise, were not raised from seed, but were propagated asexually; that is, from cuttings, by stooling, mound layering and other practices. In this way each rooted stock, since it came from a single variety, was in the main like every other stock derived from the original variety, and therefore could be expected to affect a top-worked variety in a similar manner. Thus we had dwarfed standard varieties which could be developed into certain forms and which were quite uniform in their bearing habits.

In these dwarf stocks there was the suggestion that the same type of propagation might be applied to some of our hardy free-growing varieties. If such varieties could be own-rooted and used as stocks for standard varieties, then the problem of wide variability in tree production could be eliminated, as every tree in the orchard would have the same type of understock, which in turn should tend to exert a like influence on vigor, hardiness and production.

This suggestion as a solution of the orchard stock problem immediately presented two other definite problems; first, a practical method for rooting desirable varieties, and, second, a determination as to whether or not the own-rooted stocks had the desired effect on the top-worked variety in respect to the elimination of variability in different forms.

Own-rooted Stocks.

The problem of rooting free-growing desirable varieties has been attacked in a vigorous manner from a number of different angles, but to date in the United States no practical method has been developed which can be used to propagate own-rooted stocks in commercial quantities. Some progress has been made in producing a limited number of own-rooted trees. Here at the Iowa agricultural experiment station we have developed a method, which consists of wrapping label wire or wire of small gauge around the graft union of newly made grafts. These grafts are then planted and the girdling which subsequently takes place forces root formation on the scions of about forty per cent of the grafts. Stocks from hardy varieties like Virginia crab, Hibernal and Dudley have been own-rooted, then top-worked to standard varieties and set in an experimental orchard. In the future these trees should furnish considerable information as to whether own-rooted stocks have a desirable effect on growth and production.

Several English investigators have gone into this stock problem in a thorough manner. They have been successful in work involving the standardization of stock varieties and in the perfection of propagation methods for dwarf and standard stocks suitable for European conditions, but they have not yet proved to the entire satisfaction of critical investigators that the use of own-rooted stocks necessarily eliminates variability in production.

There is another proposal for the solution of the orchard stock problem—the production of seedling stocks from seed selected from varieties of known vigor, hardiness, production and resistance to disease and insects. It is believed that considerable progress can be accomplished in this line. The Iowa station has grown several hundred lots of seedlings from certain varieties, especially from varieties with small fruit and high seed content, such sorts as might be readily available to nurserymen or could be planted in orchards for seed production. The work has resulted in the selection of a number of varieties which from the standpoint of seed germination and vigor of growth of seedlings are far superior to the ordinary run of stocks grown from imported seed. Varieties like Whitney, Wealthy, Windsor, Allen Choice, Malinda and several seedlings of known crossbred parentage produce stocks which are admirably adapted for the production of grafted or budded nursery trees. There is also another possibility in the use of these hardy stocks, and that is the elimination of a large percentage of crown gall and callus knot growth, which is mainly associated with root-grafted trees. With the use of a hardy line of seedlings budding could be practiced, and this would eliminate at

least seventy-five per cent of the crown gall and callus knot trouble. The French seedlings which are now used are not sufficiently hardy in the crown of the root to be used for budding.

It has also been found that certain of our hardiest varieties are unsuitable for the production of seedling stocks. Virginia crab, Longfield and Hibernal, which perhaps would be the first to be selected as seed parents, produce seed which is extremely low in germination, and the seedlings which they do produce are absolutely worthless for stock purposes. When the demand comes, and it eventually will, for the production of domestically grown stocks, these data are available and should prove of great value to the nursery and orchard industry.

Top-working.

Another practical way of improving our orchard conditions is by the use of double-worked stocks. This implies a tree build-up of an unknown seedling root and a known hardy root-grafted stem piece, on which is top-worked by budding or grafting a desirable standard variety. In Iowa and most other states of the upper Mississippi valley, as well as Canada, where winter injury is the limiting factor of successful orcharding, top-working on hardy stocks is practiced as one method for increasing the hardiness of the best commercial varieties like Jonathan, Grimes and Delicious.

It is an open question whether a tender variety is rendered more cold-resistant by top-working it on a hardy stock. Hardiness is but a relative term. In a broad sense, it is the ability of a plant to withstand adverse conditions of climate, neglect, insects and disease attack, etc. At any rate, there is evidence to show that certain hardy stocks may extend the life of a less hardy top, and this is the fact which is of most importance to the fruit grower.

Some information which has a direct bearing on the above question is available in the records taken in the orchard of W. P. Campbell, Woodbine, Ia. This 20-acre orchard was planted by D. W. Lotspeich in 1893-1894. Grimes, Gano and Jonathan were planted as root grafts on French crab stock and the same varieties were also trunk-grafted on 2-year-old root-grafted stocks of Virginia crab, Haas and Sheriff.

In 1914 a record of the condition of all the trees in the orchard was made, and again in 1934 another condition record was taken. Table I indicates quite clearly that the use of the double-worked stocks of Virginia crab, Haas and Sheriff increased the life of Jonathan, Grimes and Gano over the same varieties root-grafted on French crab. The data are of particular interest in respect to Gano. In southwestern Iowa, where thousands of these trees existed twenty-five years ago, now comparatively few old trees remain. The majority of the trees went out during the period of 1910-20 as a result of drought, overproduction and winter injury, which weakened the trees and rendered them susceptible to the attacks of blister canker. It is of interest to note that during the forty years' history of this orchard the surviving trees have experienced all the vicissitudes of midwestern climate, ranging from intense drought and summer heat to winter cold of 40 degrees below zero.

In the Campbell orchard there are top-worked trees of Grimes and Jonathan which produce thirty to forty bushels per tree in crop years. Some of the outstanding trees are those worked on Haas and Sheriff.

TABLE I.

Record of top-worked apple trees in W. P. Campbell orchard, Woodbine, Ia. Orchard planted by D. W. Lotspeich, 1893-94.

Variety and stock	Trees alive 1914	Trees alive 1934	Percentage of trees alive 1934
Grimes on French crab.....	72	3	4.0
Grimes on Virginia crab....	22	16	72.0
Grimes on Haas.....	135	52	38.0
Grimes on Sheriff.....	9	7	77.0
Gano on French crab.....	84	3	3.5
Gano on Sheriff.....	37	26	70.0
Sheriff on French crab.....	108	66	61.0
Jonathan on French crab....	113	30	26.0
Jonathan on Virginia crab..	13	7	54.0
Jonathan on Haas.....	44	36	82.0
Jonathan on Sheriff.....	2	2	100.0

Observations and replies to questionnaires assembled by the pomology subsection of Iowa State College over a period of years indicate that the varieties which are outstanding for use in top-working are Virginia crab, Hibernal and Haas. Sheriff has not been used to any extent, but its performance in the orchard at Woodbine indicates that it has outstanding possibilities for stock purposes.

Outstanding Varieties.

Hibernal is one of the Russian importations sent to the United States Department of Agriculture in 1870 by Dr. Regeler, of St. Petersburg. It is considered the hardiest of all the large-fruited apples of P. malus. Its distinguishing characteristics are: The branches make nearly 90-degree angles with the trunk. Bark, chocolate brown; leaves, large, roundish, quirked at tip, upper surface rugose, wrinkled, edges waved; serrations, regular, medium in depth; pubescence, very heavy on underside of leaf. In the nursery this variety might be mixed by Oldenburg, but it is distinct from that variety in its wide-angled crotch structure, and thick, heavy leaves of a lighter shade of green than those of Oldenburg. Its foliage is outstanding in comparison to any other common variety.

Haas is a vigorous grower, with long, slender branches, which make rather narrow-angled crotches with the trunk. Bark, dark green with a grayish scarf skin; leaves, large, dark green, edges wavy; serrations, fine, compound. It would be rather difficult to identify nursery mixtures in this variety by leaf characters alone, but it could be distinguished from other varieties by its long, slender branch formation.

Virginia crab as grown in the middle west must not be confused with the Hewes' Virginia crab or seedlings grown from this variety. The Hewes' Virginia was first described by Coxe in 1817.

The Virginia crab now grown throughout the middle west originated in the nursery of Suel Foster, Muscatine, Ia. It was pointed out to Mr. Foster by N. K. Fluke as a mixture in a lot of Hewes' Virginia crab. While the literature makes this statement, it is otherwise understood that it was selected as a variation in a lot of seedlings of the Hewes' Virginia. Mr. Fluke sets the date of its origin as 1862. In 1888 he stated that his orchard trees of the variety planted in 1866 were four feet in circumference. For years Mr. Fluke was a prominent fruit grower at Davenport, Ia., and was largely instrumental in the introduction of the Virginia crab as a stock.

The tree of this variety is very vigorous and has a widespreading form. On young trees the bark is olive green, covered on 2-year-old and older wood with a characteristic grayish netted scarf skin. The branches are heavily shouldered and form nearly 90-degree angles with the trunk, but grow out horizontally from six to twelve inches and then turn sharply upward. The limbs seldom split down from fruit loads or ordinary causes. These characteristics distinguish the variety from almost any other common crab variety. The leaves are thick, leathery, distinct olive green, smooth upper surface,

long, medium width, folded upward, pubescent beneath; serrations, very distinctive, sharply serrate, nearly dentate; stipules, very long, persistent; veins, heavy.

Attention has been called to the possibility of the existence of certain strains in the variety. The writers have been familiar with the variety for at least twenty years and have never noted any variation in the type, but have found various mixtures of it and other varieties in the nursery and orchard plantings, such as Pyrus baccata, Yellow Siberian, Shields crab, etc. These or other crab mixtures are easily separated from the true Virginia by their lighter-colored bark and leaves and sharp-angled crotches. Practically all references to Virginia crab indicate that it is highly resistant to blight in trunk and branches. The writers have never observed blight in the variety in any age of tree.

The foregoing stocks in general make good unions with the common commercial varieties. Virginia slightly overgrows the top-worked variety. Hibernal makes fine unions with Grimes, Jonathan and Delicious. The union of Haas with Jonathan and Grimes is often so smooth that the line of separation is scarcely distinguishable.

Top-working on Virginia and Hibernal should be done on the branches in order to take advantage of the splendid limb structure of these stocks. The best practice of double working is to plant 2-year-old root-grafted trees, allow them to grow for one year in the orchard and then bud in the branches. Haas has sharper-angled crotches, but with age develops a wide-spreading tree. It makes an excellent stock when stem-worked.

Virginia, Hibernal and Haas, together with Sheriff, deserve the careful attention of fruit growers who are setting out new or replanting old orchards. From the general experience of fruit growers in the middle west it is evident that top-working on hardy stocks is conducive of vigor, productiveness, disease-resistance and long life in the top-worked variety.

The foregoing account has been prepared with the idea that the information given be taken as suggestive rather than conclusive. It is felt that too little attention has been given to the understocks which are so fundamental to the success or failure of our orchards. It is now time for fruit growers to advance their viewpoint and to give careful consideration to some of the newer practices which may be of great value in the development of longer-lived and more productive orchards.

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TREAT FOR PEACH BORERS.

Although treatment for peach borer is usually regarded as a fall operation, the weakened condition of many peach trees this spring due to the cold weather of two years ago and the drought that followed makes it highly advisable to take steps to combat borers now. Treatment consists of applying paradichlorobenzene, either as crystals around the base of the tree or in the form of an oil emulsion.

Spring treatment should be completed by the middle of May. Little, if any, feeding is done by the peach-tree borer during the winter, but with rising temperatures in April and May feeding is resumed and a large amount of girdling may be accomplished, which will shorten the life of the tree, if it does not actually kill it. With many peach trees severely injured from low temperatures and dry weather, this added drain on the trees may be more than they can overcome. It is highly desirable, therefore, to take immediate steps to combat borers now present in the trees.

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To Texas Nurserymen!

Plea for Strong Membership in State Association by Miss Wilma Gunter, Chairman of Publicity Committee

There are but few nurserymen in the state of Texas who have not heard of the organization proceedings of the Texas Association of Nurserymen, in September, 1935. There are, however, a large number of nurserymen, dealers and landscape men who have not become affiliated with this association.

The strength of any organization is not only measured by its accomplishments, but by the number the association serves and serves well. The larger the membership, the more power a nurserymen's association can have, not only in guiding and obtaining advantages to the nursery industry, but also through the necessary financial backing.

A short time ago the chairman of the membership committee, O. S. Gray, of Arlington, Tex., sent out a letter to many nurserymen of the state, inviting new membership. Some nurserymen may have received this and immediately responded by joining the association, while others may have put it aside to wait for a more opportune time. The most opportune time is today—a larger membership is needed to be a truly representative Texas Association of Nurserymen.

There are matters pertaining to nursery inspection, legislation, transportation, freight rates and taxation of nursery products which should be of particular interest to all nurserymen in the state.

The membership dues of the Texas Association of Nurserymen was set on a basis of $3 per year, which is a nominal fee. Membership applications may be obtained from Mr. Gray or from the secretary-treasurer, Lee Mosty, Center Point, Tex.

Why not give Mr. Gray a real boost in his membership drive and raise the membership by the end of this month to 300? Even this number will be but a small percentage of the registered nurserymen in the state—and nurserymen of adjoining states are likewise invited to join.

A membership in the Texas Association of Nurserymen will be really worth while this year. It will be up to the members of the Texas association to show the A. A. N. convention members just what we have in the way of the nursery and horticultural development in Texas. With you a member of the Texas Association of Nurserymen and lending your support to it, your help will be of great benefit. Let's have all nurserymen of Texas as members!

SPRAY FOR SPRUCE GALLS.

A single well timed application of a lime-sulphur spray or of a nicotine spray applied thoroughly to spruce trees will generally give satisfactory control of the tiny aphis which are responsible for the unsightly galls that are frequently found at the base of the new growth on spruce trees, says Dr. F. L. Gambrell, entomologist at the New York state experiment station, at Geneva, who is making a special study of insect pests of ornamentals. Sprays directed against the spruce gall aphis should be made from the middle to the latter part of April, he says.

The insects are commonly found on Norway spruce and occasionally on red, black, Engelmann and Colorado blue spruce, although the species usually found on the two last-named is the Sitka gall aphis, a closely related insect. The presence of the spruce gall aphis is easily detected by the pineapple-like enlargements, or galls, at the base of the new growth. These galls are produced by the feeding of the overwintering females and their progeny. The young aphis also develop within these galls during the spring.

Tests made at the experiment station show that this insect can be easily controlled if the treatment is timely and thorough. The period for the most effective application of insecticides extends from the middle to the latter part of April. For trees about the home grounds, a single application of commercial lime-suphur diluted at the rate of three-fourths pint in a gallon of

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water or of a mixture of one tablespoonful of nicotine and an ounce of laundry soap or soap chips in a gallon of water will give good results. The nicotine spray should be applied on a warm, sunny day, and all spraying should be thorough enough to cover the branches completely out to the tips, particularly the undersides. For the nurseryman with large plantings, oil sprays can be used in the spring with comparative safety and will give good results.

WINTER INJURY ON RASPBERRIES.

Raspberry growers in general fail to recognize the symptoms of winter injury in their plantings because few plants are killed outright by cold weather, winter injury usually being confined to the canes for a few inches to a foot above the ground line, with collapse following later in the season due to interference with the water supply of the plant.

The winterkilling of the tip ends of shoots and laterals is rather common, but it is a comparatively unimportant source of loss. Then, too, the fruit buds of commercial varieties of red, black and purple raspberries of average vigor are perfectly hardy to temperatures of 30 to 35 degrees below zero for short periods. Also bark injury is not serious. Furthermore, raspberry roots and crowns are rarely affected by cold and, when they do not survive the winter, it will generally be found that poor soil drainage, rather than low temperatures, is the cause of the trouble.

The really critical tissue in the raspberry is the wood, or water-conducting elements in the canes. This wood seems especially tender in a zone from a few inches to a foot or so above the ground. This zone is a vital spot, because it connects the hardy roots and hardy crowns below with the hardy buds above which are eventually to bear the crop. Most wood injury involves only portions of the cane, and this localized damage seldom consists of immediate and entire killing. Deterioration of partially injured wood cells ensues gradually, however, eventually resulting in complete loss of function and the death of the cane. This process may take a few days or it may require several weeks, and accounts for the sudden collapse of plants without apparent cause.

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Golden Sweet	50	...	...
Grimes Golden	50	200	250
Hyslop	30	75	...
Jonathan	70	50	80
McIntosh	10	50	40
Maiden Blush	100	...	...
Northern Spy	80	...	...
Red Astrachan	50	...	...
Rome Beauty	70	50	...
R. I. Greening	...	30	50
Stayman Winesap	50	...	100
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Wealthy	40	100	...
Winesap	40	...	...
Wolf River	30	...	...
York Imperial	80	...	...

SWEET CHERRY			
Black Tartarian	40	250	250
Governor Wood	...	100	100
May Duke	20	...	...
Napoleon	...	50	...

SOUR CHERRY			
Early Richmond	100	150	...
Montmorency	140	200	...

PEACH	1½-in.	⅞-in.	⅝-in.
Belle of Georgia	80	300	130
Carman	130	100	70
Chair's Choice	10	...	...
Champion	20	...	...
Early Elberta	20	350	250
Elberta	150	800	700
Golden Jubilee	...	100	300
Heath	20	...	...
Hiley	130	...	...
J. H. Hale	130	600	500
Late Crawford	...	100	...
Mayflower	50	...	...
Rochester	...	100	...
South Haven	80	100	100

PLUM			
Abundance	...	30	60
Bradshaw	...	50	...
Burbank	25	275	300
Shropshire Damson	...	100	...

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Alexander	...	...	220
Early Golden	...	...	30
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Hybrid Rhododendrons—in variety.
Carolina Hemlock, 5 to 6 ft.; **Berberis Julianæ,** 1½ to 2 ft.
Koster's Blue Spruce, 6 to 8 ft.; **Pieris Japonica,** 1½ to 2 ft.

Prices gladly quoted on your requirements.

Write for 1936 wholesale catalogue.

Bobbink & Atkins, Box V, **Rutherford, N. J.**

There is no way to remedy the situation, but it is possible to ascertain the extent of the injury early in the season and thus be forewarned of what to expect. This is accomplished by shaving off the bark in small patches on the sides of the canes near the ground. If the wood is white or greenish in color and moist, no damage has been done. If it is brown and dry, it is dead and trouble may be expected later in the season. Between these two extremes are all degrees of injury which one learns to recognize.

WILLOW LEAF BEETLE.

The willow leaf beetle is metallic blue in color, oval and rounded, about one-eighth of an inch long. There are two broods a year. It passes the winter under the rough bark of willow trees. Spraying for it should be done early in June with arsenate of lead, two pounds to fifty gallons of water. The spray must hit the underside of leaves, as the beetle feeds only on that surface. This beetle frequently destroys all the foliage on certain species of willows.

THE CICADAS ARE COMING.

This is the year for one of the largest broods of the periodical cicada—popularly, though erroneously, called the 17-year locust—to appear in the north, and for a smaller brood in the south. Brood X, last seen and heard in 1919, is scheduled to come out from its long life underground the last of May over its usual range—from New York state west to Missouri and from Michigan to northern Alabama and Georgia. Brood XXII, which has remained in its subterranean cells for thirteen years, is due in Louisiana and Mississippi the last of April or first of May.

These outbreaks will be harder on human eardrums than on crops, according to Lee A. Strong, chief of the bureau of entomology and plant quarantine of the United States Department of Agriculture. The concatenation of shrill calls that heralds the brood's return to sunlight is the composite love song of the males. Any damage to vegetation is done by the females. With their sawlike appendages, the mothers carve row upon row of egg pockets in tree twigs, preferably oak, hickory and apple, though peach and pear trees, grapevines and many other plants are satisfactory. Sometimes these pockets are so numerous and so close together that twigs or stems break off. This haphazard pruning has little effect on large trees, but may injure small ones.

From the time it was first seen by white men, the periodical cicada has been the subject of more misinformation than almost any other North American insect. Coming from northern Europe, where locusts were unknown, the Pilgrim Fathers made the original mistake in identifying the insects that swarmed suddenly out of the New England forests. The Puritans assumed they were another plague of Egypt sent as a punishment for sin.

The periodical cicada, however, is not even remotely related to the insect which, under the name of locust, still destroys grain along the banks of the Nile, as well as in many other parts of the world, and, under the name of grasshopper, is one of the most serious grain pests in the United States and Canada. The locust, or grasshopper, with strong chewing jaws, breaks off the stems of the succulent young grain on which it feeds and soon devastates a field. The periodical cicada—a toothless insect—sucks its food from plants without seriously harming them.

Startling features of periodical cicada outbreaks, one of which occurs every year in some part of the country, are the suddenness with which the insects appear and the enormous numbers that congregate in one area. Overnight the ground will be riddled with millions of holes through which the pupæ have crawled.

The adult emerges from the pupal shell as a small, bizarre-looking creature, milky white, with red eyes. Its body soon hardens and turns black and its four nearly transparent wings unfold. The legs and margins of the principal veins of the wings are bright orange. Near the outer end of the front wing is a distinct black "W," produced by deeper pigmentation. This letter has given rise to another myth—that the coming of the periodical cicada is an omen of war.

Early in June the adults start to die—first the males, then the females—littering the ground with wings and dismembered bodies. Innumerable larvæ, hatching from the eggs, fall to the ground, burrow in, attach their mouths to a nourishing root and wait for another seventeen years to roll round.

Each of the thirty known broods of the periodical cicada follows regularly its period of emergence—seventeen years in the north and thirteen years in the south. Originally the broods probably were evenly distributed. Unfavorable weather, a catastrophe such as a forest fire or undue activity of natural enemies may have given the initial impetus to periodical broods in various regions. The important broods, like brood X, are known to have appeared at regular intervals for a long time—in one case for more than 200 years.

KANSAS SHELTERBELT.

According to Charles A. Scott, state director of the Kansas shelterbelt project, 5,760 acres of shelterbelts will be planted in thirteen counties of the state within the next forty-five days.

The shelterbelts will be on 524 farms in Harper, Barber, Comanche, Clark, Pratt, Kiowa, Ford, Reno, Stafford, Edwards, Barton, Pawnee and Hodgeman counties, he said.

In addition to the shelterbelt plantings, the director said, applications are on hand for 800 acres of farmstead plantings, which consist of five or more rows of trees planted to protect farm buildings.

Mr. Scott declared more than five million trees and shrubs will be required for the plantings. The shelterbelt plantings total 288 linear miles ten rods in width.

For the shelterbelts, the landowner furnishes the land and provides fence materials. The forest service will build the fence, plant the trees and care for them until June 30.

Mr. Scott stated 400 men had been employed in the program and that until June 30 more than 500 will be kept busy planting and caring for trees and growing seedlings.

The plantings are additional to the shelterbelt strips planted a year ago in the federal government's program for a belt of trees extending north and south across the country.

MINNESOTA NURSERY STOCK.

Little planting of nursery stock is being done in Minnesota because of continued cold weather. Fruit trees generally have come through the winter with surprisingly little injury. Pears have been badly killed, and in some sections the same holds true for evergreens. In the northern half of Minnesota reports are that many evergreens are browned severely, while some have been killed outright. In the vicinity of the Twin Cities, on the other hand, there has been little or no winterkilling; a few shrubs greatly susceptible to having their tips killed are good to the last inch. Last fall the weather was favorable, the temperature dropping gradually, so that the shrubs and trees were hardened sufficiently to withstand the unusually severe conditions which followed. Another feature which helped shrubs considerably was the absence of a January thaw. The humidity of the air was also much higher than usual. This helped to prevent the drying out and hard freezing which would otherwise have followed.

PLANS for a spectacular flower festival to focus attention on the nationally recognized nursery center in Lake county, O., took shape April 8, when members of the chamber of commerce at Mentor, O., enthusiastically offered to coöperate with local nurseries in presenting a colorful pageant this summer.

Milton Nursery Co.
Milton, Oregon
Maple, in assortment for Parks, Cemeteries, Subdivisions and Landscape Work. **Birch** in variety. **Hawthorn** and other **Ornamental** and **Shade Trees.**
Seedlings, Fruit and Shade Trees, in assortment.
Ample and Complete Stocks.
Car lot shipments at reasonable freight rates.

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Wholesale Rose Growers
SCAPPOOSE, OREGON

	100	1000
Thuja orientalis, seedlings, 3-5 in.	$1.50	$12.00
Rhododendron ponticum, seedlings, 2-3 in.	3.00	25.00
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For Lowest Prices
Dwarf Pears and Plums
2-Year, No. 1 Grade
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Send for **Toole's Trade List of Twenty-five New, Unusual or Little Known Perennials and Rock Garden Plants.**
Potted plants at prices that make a trial planting inexpensive.
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TREE PEONIES
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. . . . . *a good supply of*

SOUR and SWEET CHERRIES
APPLE — PEACH — PEAR
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FRUIT TREE SEEDLINGS
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Write for new **TRADE LIST**, just off the press.

Will appreciate your **WANT LIST.**

MOUNT ARBOR NURSERIES
E. S. Welch, Pres. Shenandoah, Iowa
"One of America's Foremost Nurseries"

QUALITY LINING-OUT STOCK

EVERGREENS — DECIDUOUS

Grown from the finest seed

Write for our Wholesale Price List

MATHEWS-EGGERT NURSERY
342 Apple Ave., Muskegon, Mich.

A Good Buy
3/8-in.—3 to 4 ft. Peaches, $12.50 per 100. Elberta—Hale—Rochester—Carman. Barberry Thunbergii, 2 to 3 ft., $60.00 per 1000. Write for low prices on shrubs, etc.
Maloney Bros. Nursery Co., Inc.
Dansville New York

LINING-OUT STOCK
Connecticut Valley Grown
Seedlings - Rooted Cuttings
Evergreen and Deciduous
Write for List
C. E. WILSON & CO., INC.
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HILL'S EVERGREENS
Complete assortment of lining out sizes
Also larger grades for landscaping
Send for our wholesale catalogue
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EVERGREEN SPECIALISTS
Largest Growers in America
Box 402 DUNDEE, ILLINOIS

Canterbury Boxwood
Buxus suffruticosa and B. sempervirens.
Selected uniform plants; bushy and foliaged to center; masses of fibrous roots. Finished specimens from 4 inches up, ready for quick shipment. Prices lower, plants larger. Ask for special list.
CANTERBURY NURSERIES, Inc., Box R, Easton, Md.

LANDSCAPE GROUP MEETS.

The April get-together of the Columbus Landscape Association was a dinner meeting and was held Tuesday evening, April 14, in the Charminel hotel, Columbus, O.

President L. C. Chadwick called the business session to order and Acting Secretary Howard Warwick read correspondence, which included a letter from the Columbus Florists' Association expressing appreciation of having been the guests of the landscapers at a recent meeting. A brief report of the Columbus national home show was given by Mr. Kleinmeyer. The treasurer was authorized to pay all outstanding bills in connection with the show. A rising vote of thanks was given Frank Packard for his efforts in making the landscape displays outstanding at the exhibition.

G. Bret Slemmons was called on for a short talk on some phases of landscape merchandising. A few pertinent points of his timely talk included the following: The landscaping business has made great strides on the cultural end, but the merchandising advances have not kept pace. Possibly the landscape business all over the country would be further ahead by consolidating and employing specialists. Fully three-quarters of all home grounds in Columbus need landscape attention, but the problem is how to interest as many as possible of these people to have their homes landscaped. It is up to all in the trade to study their profession, so that they can give customers the utmost satisfaction while making more money on the job for themselves.

A short report of the S. A. F. and International flower shows was made by President Chadwick and W. P. Robinson, in which it was commented that the gardens are becoming an increasingly important part of major flower shows.

Carl Frey told of his connection with the rural electrification project and of the immense amount of good this project has done and will continue to do, not only to make life more enjoyable for thousands of farm folks, but also for people in cities, who will undoubtedly find a reduction in the cost of electricity in the near future. He also commented on the general trend, as noted in many recent visits to Washington, toward a consumers' revolt against excessive prices and stated that this revolt may grow to sufficient degree to demand action within three or four years.

The matter of a spring trip into the Hocking county hills was tabled until the next meeting. Starr Windsor was asked to continue the discussion of merchandising at the May meeting.

PATENT NEW ROSE.

A patent was granted on a new rose April 14, announce Rummler, Rummler & Woodworth, patent lawyers of Chicago:

No. 174. Rose. Pedro Dot, San Feliu de Llobregat, Spain, assignor to the Conard-Pyle Co., West Grove, Pa. A new and distinct variety of rose plant, characterized by the novelty of the color of its fragrant flowers through all stages of their development.

DAYBREAK NURSERIES, Westport, Conn., landscaped the replica of the birthplace, at Ayr, Scotland, of the poet, Robert Burns, which was taken from Westfield, N. J., to the recent national home show in New York.

"J & P" ROSE NOVELTIES

ANNOUNCEMENT

Jackson & Perkins Patented Roses may now be secured from a group of selected growers throughout the nation. The following firms have been licensed to rewholesale J & P Patented Roses:

Adams Nurs. Inc., Springfield, Mass.
Bobbink & Atkins, Rutherford, N. J.
Brown Floral Co., Salt Lake City, Utah.
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Cashman Nurs., Owatonna, Minn.
Chase Nurs. Co., Chase, Alabama
Cole Nurs. Co., Painesville, Ohio
Conard-Pyle Co., West Grove, Pa.
Dixie Rose Nurs., Tyler, Texas
Dreer, Hy. A. Inc., Riverton, N. J.
Germain Seed & Plant Co., Los Angeles, Cal.
Howard Rose Co., Hemet, Cal.
Klyn, Gerard K., Menter, Ohio
Mount Arbor Nurs., Shenandoah, Iowa
Ruehl-Wheeler Co., San Jose, Cal.
Shenandoah Nurs., Shenandoah, Iowa
Smith, W. & T. Co., Geneva, N. Y.
Somerset Rose Nurs., New Brunswick, N. J.
Storrs & Harrison Co., Painesville, Ohio
Vaughan's Seed Store, Chicago, Ill.
Westover Nurs., Clayton, Mo.
C. E. Wilson & Co., Inc., Manchester, Conn.

JACKSON & PERKINS CO.
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Wholesale Only

Our usual line of quality nursery stock, including Shade and Flowering Ornamental Trees and Specialties, Fruit Tree Seedlings and Roses.

Grown Right and Packed Right

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MANCHESTER, CONN.
HEAVY SURPLUS ON SOME ITEMS
Write for Low Prices

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of PRINCETON, N. J.
SUPERIOR
Hardy Ornamentals

PRIVET and BERBERIS
Splendid Stock
Write for Special Quotations
LESTER C. LOVETT
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GARDENERS' CONVENTION.

The twenty-sixth annual convention of the National Association of Gardeners will be held at the Hotel Douglas, Newark, N. J., August 18 to 20.

Several prominent owners of estates and well known commercial horticultural establishments in northern New Jersey, also the Essex county and Union county park commissions are coöperating with the convention committee of the northern New Jersey branch in preparing an interesting program. John Thompson, Cranford, N. J., is general convention chairman.

The association is deeply concerned with the training of young gardeners and is coöperating with the New York Botanical Garden in the school for gardeners, established there on lines similar to those at Kew Gardens, London, and in the course of scientific lectures for professional gardeners held weekly during the winter and spring in New York city. In coöperation with the Massachusetts Horticultural Society, the Boston branch of the National Association of Gardeners sponsors a course of scientific lectures in Boston and, in coöperation with the Pennsylvania Horticultural Society and Pennsylvania State College, the Philadelphia branch sponsors a series of lectures in Philadelphia. A series of lectures is given under the auspices of the Cleveland branch, with the aid of the Ohio State University and Ohio experimental station. And it is expected that similar lectures on the sciences pertaining to gardening will be given in Detroit and Pittsburgh under the auspices of the Detroit branch and the western Pennsylvania branch, respectively.

The twentieth branch of the association has just been organized, in Baltimore. The District of Columbia branch is largely responsible for the new Baltimore branch, having encouraged the members in and around Baltimore to organize it. In addition to the branches previously named, the National Association of Gardeners has branches in Hartford and Ridgefield, Conn.; Westchester, Tuxedo and Buffalo, N. Y.; Monmouth and Elberon, N. J.; western and eastern Long Island, Chicago, and Indianapolis.

The headquarters of the National Association of Gardeners are located in the R. K. O. building, 1270 Sixth avenue, New York.

CATALOGUES RECEIVED.

Upton Gardens, Colorado Springs, Colo.—Replete with interesting small photographs is this catalogue of seeds and stock of Rocky mountain plants—herbaceous and woody. The list is alphabetical. Only a few Colorado evergreens compose the list of tree seeds. Collections of stock for the novice and the connoisseur are offered.

Esham's Nurseries, Frankford, Del.—A 12-page booklet giving a surplus list of lining-out and specimen nursery stock. Besides woody material, there is a brief listing of perennials.

Le-Mac Nurseries, Hampton, Va.—Two pages for memorandums are found at the back of the wholesale price list of this firm for spring, 1936. There is a considerable listing of azaleas, in which Le-Mac Nurseries specialize. In addition, the numerous genera range from abelia to viburnum. A concise list of lining-out stock concludes the offers.

Fairground Gardens, St. Johnsbury, Vt.—An 8-page price list of garden stock, including bulbs, seeds and nursery material: also of garden supplies.

Orpet Nursery, Santa Barbara, Cal.—A fine half-tone of Lachenalia pendula superba is reproduced on the cover of the retail bulb list for this year of the Orpet Nursery. Most of the stock listed is of new introductions of more or less uncommon genera.

S. C. S. WOODLAND SPECIALIST.

John F. Preston, of Erie, Pa., has been named head of the woodland management section of the soil conservation service, H. H. Bennett, chief of the service, announced last week. He will supervise the forestry and woodland phases of the soil-erosion control program now being carried on by the service in 141 demonstration areas and more than 450 C. C. C. camps throughout the country. He also will maintain cooperation with the forest service and other agencies interested in woodland work. He was in the forest service for eighteen years, beginning in 1907; was supervisor of the Beartooth and Blackfeet national forests, in Montana; served for ten years as chief of the branches of operation and forest management in Montana and northern Idaho, and spent an additional five years in the Washington, D. C., office in forest management work. For the past ten years Mr. Preston has been forester for the Hammermill Paper Co.

"On many of the demonstration areas of the soil conservation service, from forty to fifty per cent of the farms are in woodlands," says Mr. Preston. "These trees play a most important part in the control of soil erosion.

"Experiments have shown that forest soil soaks up fifty times more water than bare soil. Moreover, other experiments have indicated that water runs off abandoned crop land about twelve times as fast as it does off forest land. On absolutely bare land the water runs off approximately thirty times as fast.

"The soil conservation service is particularly concerned with the improvement of timber stands on agricultural land affected by soil erosion, and in the growth of trees that will provide financial returns to the farmer. If properly managed, existing wood lots can play a vital part in controlling erosion and give a cash return too. Of course, new wood lots will be necessary on many eroded farms that have lost their timber growth for one reason or another."

BLUE SPRUCE FROM SEEDS.

When should blue spruce tree seeds be sown? C. S.—Pa.

Seeds of the blue spruce should be sown in spring. Germination will be better if the seeds are placed in moist, acid peat for a month or two at a temperature between 32 and 50 degrees before they are planted.

ROOTING GOLDEN ARBOR-VITÆ.

We would like some information on how to root Berckmans Golden arbor-vitæ. We have an electric propagating house and root nearly every variety of evergreen 100 per cent, but we have had no luck with Berckmans Golden. S. N.—Ill.

Berckmans Golden arbor-vitæ usually roots with some difficulty and, consequently, I frequently find nurserymen grafting it rather than trying to grow it from cuttings. The best results that I have had with this variety were obtained when cuttings were taken about mid-November and handled in sand with a temperature of about 65 degrees Fahrenheit. Usually, however, the percentage of rooting will not run much better than sixty-five to seventy per cent. The humidity of the house should be kept fairly high, but not so high that it causes molding of the leaves of the cuttings. If they are placed rather close in the bench, this often occurs. I would suggest, if you have large quantities to propagate, that you try grafting, using the oriental or American arbor-vitæ as understock, rather than growing them from cuttings. Dr. L. C. Chadwick.

We give Berckmans Golden arbor-vitæ the same treatment as other varieties with equal success. We have about 140,000 rooted cuttings of the Berckmans, which represent at least ninety-eight per cent of the plants being rooted. It is a plant that needs considerable heat. Baker Bros. Co.

NEARLY thirty members of the Central California Nurserymen's association met in Woodland, Cal., April 18 for a business meeting and dinner. Clarence Vaughn was the host, and C. E. Berry, Yolo county agricultural commissioner, was the main speaker.

Raspberries, Blackberries Grapevines, Strawberries
General Line of Small Fruit Plants
Trade list sent upon request
Rambo's Wholesale Nurseries
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ALPINE CURRANT
3 yr., heavy, well branched, while they last, 18 to 24 in., $20.00 per 100
Cornus Paniculata, 2 to 3 ft., $18.00 per 100
Rosa Rubrifolia and Rubiginosa, 2 to 3 ft., $17.00 per 100
Also Rhus Glabra and Amur River N. Privet.
ESCHRICH'S NURSERY
Station F, Milwaukee, Wis.

"A friendly, efficient sales service"
HEAVY, 2-YEAR-OLD PRIVET

	Per 1000
2000 Ligustrum Amurense, 12 to 18 in..	$40.00
9000 Ligustrum Amurense, 18 to 24 in..	50.00
1600 Ligustrum Amurense, 2 to 2½ ft..	60.00
4000 Ligustrum Amurense, 2½ to 3 ft..	80.00
8000 Ligustrum Ibolium, 18 to 24 in....	30.00
7500 Ligustrum Ibolium, 2 to 3 ft.....	40.00
3000 Ligustrum Ibolium, 3 to 4 ft.....	60.00
	Per 100
1000 Buddleia Magnifica Superba, No. 1.	$12.00
1000 Buddleia Magnifica Superba, No. 1½	10.00
800 Buddleia Magnifica Superba, No. 2.	8.00
5000 Phlox Divaricata Laphamii Special: $10.00 per 100; $90.00 per 1000	

E. D. Robinson, Sales Agent
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Small Fruit Plants
Evergreens — Shrubs
Lining-out Stock
Send for Complete Trade List
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STRAWBERRIES, RASPBERRIES, BLACKBERRIES, DEWBERRIES, GRAPEVINES
Write for Wholesale List
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Stevensville, Mich.

Outdoor Roses and Shrubs

F.O.B. NURSERY STORAGE IN OHIO. Subject to being unsold when order is received at storage. Stored in bulk. Packing at cost. xx, 5; No. 1, 10; No. 1½, 20; No. 2, 30 to bundle.

xx and No. 1, 15c each: American Pillar, Chaplin's Pink Climber, xx; Chaplin's Pink Cl., Cl. American Beauty, Paul's Scarlet, Dr. W. Van Fleet, Scorcher, xx; Silver Moon, Silver Moon, xx; Amelie Gravereaux, Conrad F. Meyer, Dr. Eckener, Hansa, Sir Thos. Lipton.

No. 1½, 12c each: American Pillar, Dr. W. Van Fleet, Scorcher, Magna Charta, Conrad F. Meyer, Sir Thos. Lipton.

No. 2, 8c: American Pillar, Dr. W. Van Fleet, Primrose, Amelie Gravereaux, Conrad F. Meyer, Sir Thos. Lipton, Pink Grootendorst.

No. 3, 4c: F. J. Grootendorst.

No. 1, 18c: Climbing Baby Rambler, Crimson Rambler, Roserie.

No. 1½, 10c: Cl. Baby Rambler.

No. 2, 7c: Cl. Baby Rambler, Crimson Rambler, Roserie.

No. 1, 10c: Dorothy Perkins, Marie Gouchault (Improved Dorothy Perkins), White Dorothy Perkins, Excelsa.

No. 1½, 8c: Excelsa.

No. 2, 6c: Excelsa (red Dorothy Perkins).

Wisteria Chinensis (not seedlings), medium, 10c; 12 to 18 ins., 2 branches, 7c.

Forsythia Spectabilis, 18 to 24 ins., branched, 8c each.

Buddleia Alternifolia, 18 to 24 ins., light, 8c.

Privet Amoor River North, liners, $11.00 per 1000.

Orange Quince, 12 to 18 ins., 6c each.

Anger's Quince (for understocks), No. 1, $25.00; No. 2, $20.00; No. 3, $15.00 per 1000.

Ask for special prices in large quantities.

Verhalen Nursery Co.
Scottsville, Tex.

TREE SEEDS

— All Kinds —

Chinese Elm Seedlings
for spring shipment

The Barteldes Seed Co.
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Dr. L. C. Chadwick's articles on "Improved Practices in Propagation by Seed," reprinted from The American Nurseryman.

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Write for free Tree and Shrub Seed Catalogue containing flower and vegetable seeds attractively priced.

Broad-Leaved Evergreens

FROM THE HIGHLANDS OF THE CAROLINAS

Gardens of the Blue Ridge are Headquarters for Hardy Native American Plants. Our supply in both Nursery Grown and Collected woods-grown is sufficient to supply the demand.

Azaleas, Leucothoe, Kalmia, Rhododendrons, Andromedas, Orchids, Vines, Climbers, Creepers, Ferns, Liliums, Trilliums, Dicentras, and hundreds of others of tried and tested merit are grown and carried in large supply. Our 41 years' practical experience, quality, quantity, variety, low price and unequalled organization are at your command. Complete catalogue and Surplus list will be sent on request.

E. C. ROBBINS, Gardens of the Blue Ridge
ASHFORD, NORTH CAROLINA

PUBLICATIONS RECEIVED.

"Tree Fruits for Iowa," by H. L. Lantz, issued as bulletin No. 341 of the agricultural experiment station of the Iowa State College, Ames. The comprehensive data were compiled as a special project to assist Iowa orchardists in the selection of satisfactory tree fruit varieties either for home or commercial production. The greatest part of the bulletin is devoted to apples, with other sections on pears, peaches, plums and cherries. Old and new varieties are discussed.

"The Irises of Southeastern Louisiana," a taxonomic and ecological interpretation by Percy Viosca, Jr., reprinted from the bulletin of the American Iris Society as a 56-page booklet, illustrated. This is an original discussion, offering views opposed to those of some previous writers on the subject, based on extensive data. A key for the identification of the native species in Louisiana is included. Copies of the bulletin can be obtained for 50 cents each.

"New Equipment for Obtaining Host Material for the Mass Production of Trichogramma Minutum, an Egg Parasite of Various Insect Pests," is circular No. 376 issued by the United States Department of Agriculture. The authors are Herbert Spencer, entomologist; Luther Brown, associate entomologist, and Arthur M. Phillips, field assistant of the division of fruit insect investigations of the bureau of entomology and plant quarantine. For four years the bureau's parasite laboratory at Albany, Ga., has been engaged in the mass production of the trichogramma and its host insect, the Angoumois grain moth, Sitotroga cerealella. This work is described in the bulletin, along with the development of the equipment for conducting the experiments.

TOP-WORKING APPLES.

In view of current discussions, there should be considerable interest in bulletin 432, just issued by the Wisconsin agricultural experiment station on "Top and Double-Working Apple Trees." R. H. Roberts, the author, summarizes his conclusions as follows:

Top-working or double-working appears to be effective in securing stock effects, such as increased hardiness of some varieties.

A given stock may have unequal effects upon different varieties. Conversely, different varieties may respond differently on a certain stock.

Many varieties appear to have no particular effect when used as stocks.

Early, wood-maturing kinds appear to need early stocks. Late varieties may grow well on early or late stocks.

The "best stock" can be found by trial and error. The best guess is to use a variety which thrives in the location where the double-worked trees are to be grown.

When top-working young trees, maintain a good tree form.

Early bearing of top-worked old trees is secured by setting many grafts at some distance from the trunk, instead of a few cleft grafts on stubs of large branches.

ON A bid of $566.20, a contract was recently awarded to the Pacific Nurseries Co., Colma, Cal., to plant shade trees in the East Homestead district of Burlingame.

20,000 **CHERRY**, Montmorency and Early Richmond, 2-year, XX and ⅜ inch.
5,000 **SPIRÆA**, Vanhouttei, 3 to 4 feet and 4 to 5 feet.
25,000 **ELMS**, American, Vase and Moline, transplanted, up to 4 inches.
10,000 **MAPLE**, Norway, transplanted, up to 2½ inches.
3,000 **ARBOR-VITÆ**, Pyramidalis, up to 8 feet.
400 **PINE**, Mugho, from 2 to 4 feet.
1,000 **SPRUCE**, Norway, sheared, none better, 3 to 5 feet.
600 **JUNIPER**, Pfitzer's, 5 to 8 feet spread, beauties.
3,000 **ARBOR-VITÆ**, American, and **RETINOSPORAS**, 4 to 7 feet.

Send for list on many other items.

C. M. HOBBS & SONS, Inc.
Bridgeport, Indiana
Largest Nursery in Indiana. Established 1875.

"A friendly, efficient, sales service."

CANADIAN HEMLOCK

(Tsuga canadensis.)

Every plant well grown, well transplanted, full and heavy. 250 at 1000 rates.

	Per 100	Per 1000
3 to 4 ft.	$ 85.00	$ 850.00
4 to 5 ft.	125.00	1100.00
5 to 6 ft.	200.00	1750.00

E. D. Robinson, Sales Agent
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	Per 100	Per 1000
4 to 6-in.	$6.00	$40.00
6 to 8-in.	8.00	60.00
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All plants are transplanted, one year, field-grown, and well hardened. A small ball of earth with each plant. The hardiest and most beautiful azalea of them all.
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OUR PITS COMPARE FAVORABLY WITH THE BEST

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Now Booking Contracts for Fall

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EVERGREENS

For Seventy years growers of Quality Evergreens
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EVERGREEN NURSERY CO.
Established 1864 : STURGEON BAY, WIS.

OBITUARY.

John C. Chase.

Many members of nursery associations throughout the country will learn with sincere regret of the death of John Carroll Chase, head of the well known firm of the Benjamin Chase Co., Derry, N. H., large manufacturer of labels for the nursery, seed and florists' trade, at his Brookline, Mass., home April 16 at the advanced age of 87 years. Mr. Chase for years, including this year, made a practice of attending the more important conventions in the nursery trade, including the national, Pacific coast, western, southern and New England conventions, where his genial presence was always welcomed.

Born in Chester, N. H., in 1849, Mr. Chase was graduated from Pinkerton Academy, Derry, N. H., and later studied at the Massachusetts Institute of Technology, Boston. He was for years a prominent civil engineer, working on many large projects, especially water works, throughout the United States. He was the author of a number of books. He had been president for fifteen years of the New England Historic Genealogical Society. He was a member of numerous clubs and other organizations, in many of which he was quite active.

His first wife died in 1927, while his second wife, whom he married in 1928, survives him, as do two daughters and three grandchildren. Funeral services were conducted at 495 Commonwealth avenue, Brookline, April 18, with another service in the Congregational church, Derry, on the following day and interment in the family lot in Derry cemetery.

THE formal opening of the California Rose Gardens Nursery, North Hollywood, Cal., was held April 2 to 7. The nursery aims to serve the entire San Fernando valley section.

LOUIS LUNDQUIST, JR., has opened the Peekskill Nursery on Croton avenue, just off Crompond road, in Peekskill, N. Y. Mr. Lundquist is the son of Louis Lundquist, landscape gardener.

STEADY growth in the past several years of the Kniffing Bros. Nursery, in Mission Hills, San Diego, Cal., has resulted in a decision to open a branch in East San Diego. Growth in the landscape department has been exceptional, according to Louis Kniffing.

SIX nurseries—the J. W. Adams Nursery Co., Springfield, Mass.; Kelly's Hardy Plant Farm, and the firms of D. L. Cunningham and Dorothy M. Lyman, all of Pittsfield, Mass.; C. R. Burr & Co., Inc., Manchester, Conn., and Outpost Nurseries, Inc., Ridgefield, Conn.—have submitted bids for the contract to provide Pittsfield with 500 shade trees.

THE soil conservation service of the United States Department of Agriculture has collected approximately 2,300,000 pounds of tree and shrub seeds and 700,000 pounds of grass seeds. The grass seeds, together with acorns, walnuts and hickory nuts, will be planted on demonstration areas. Most of the tree seeds will be used for nursery planting. Restoration of vegetation to acres damaged by erosion is one of the surest ways to check further soil losses.

ATTENTION NURSERYMEN!

Spray with, and recommend

IMP. SOAP SPRAY

Use 1 part with 25 to 40 parts of water

Ask your nearest seedsman, or write for literature.

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Forget-Me-Not Brand
AA West Coast Raffia
excellent for nurseries.

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SITUATION WANTED

By capable retail nursery sales manager and landscape architect. Familiar with establishing sales force, drafting, estimating and complete supervision. Best references. Salary or profit sharing basis with reasonable drawing account. Address No. 33, c/o American Nurseryman, 508 S. Dearborn St., Chicago, Ill.

MRS. DOREMUS SCUDDER, of the California Nursery Co., Niles, Cal., showed colored motion pictures of spring-flowering bulbs and irises at a meeting of the Burlingame-San Mateo Garden and Flower Club in Burlingame April 7.

A NURSERY is being established just outside Larned, Kan., by W. M. Morrison, caretaker for the Larned city parks. Mr. Morrison will have associated with him his father, W. J. Morrison, and a brother-in-law, J. Robinson, and will hold his position with the idea of eventually giving all his time to the nursery.

CLASSIFIED ADVERTISING

The Lissadell list of 1935 harvested alpine and herbaceous seeds has now been posted to customers. Further copies are available for those who write.
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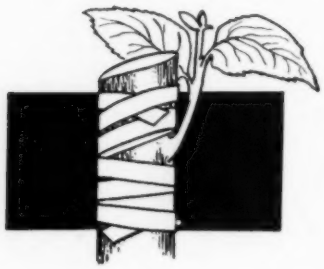

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